

CLAIMS

1. An optical information recording method for recording data on an optical information recording and reproducing medium having a plurality of recording layers which allow recording and reproducing by irradiation with a laser beam,  
characterized in that when data recording is performed on one recording layer, a recording state of the other recording layer nearer a laser beam incident surface than said one recording layer is examined by using recording layer management information, and setting of a laser beam output is changed for the recording based on whether data has been recorded or not in an area of said other recording layer stacked on an upper part of an area in which the recording is performed.
2. The optical information recording method according to claim 1, wherein the laser beam output for the recording is increased if data has been recorded in the area of said other recording layer.
3. The optical information recording method according to claim 1, wherein the laser beam output for the recording is reduced if data has been recorded in the area of said other recording layer.
- 25 4. An optical information reproducing method for reproducing data from an optical information recording and reproducing medium having a plurality of recording layers

which allow recording and reproducing by irradiation with a laser beam,

characterized in that when data reproducing is performed on one recording layer, a recording state of the 5 other recording layer nearer a laser beam incident surface than said one recording layer is examined by using recording layer management information, and setting of a laser beam output is changed for the reproducing based on whether data has been recorded or not in an area of said 10 other recording layer stacked on an upper part of an area in which the reproducing is performed.

5. The optical information reproducing method according to claim 4, wherein the laser beam output for the reproducing is increased if data has been recorded in the 15 area of said other recording layer.

6. The optical information reproducing method according to claim 4, wherein the laser beam output for the reproducing is reduced if data has been recorded in the area of said other recording layer.

20 7. An optical information recording method for recording data on an optical information recording and reproducing medium having a plurality of recording layers which allow recording and reproducing by irradiation with a laser beam,

25 characterized in that when data recording is performed on one recording layer, a recording state of the other recording layer nearer a laser beam incident surface

than said one recording layer is examined by using recording layer management information and if data recorded and unrecorded parts are mixed together in an area whose recording state is examined, an area for recording data of 5 said one recording layer is moved to another area.

8. An optical information recording and reproducing method for recording/reproducing data on and from an optical information recording/reproducing medium having a plurality of recording layers which allow recording and 10 reproducing by irradiation with a laser beam,

characterized in that when data reproducing is performed on one recording layer, a recording state of the other recording layer nearer a laser beam incident surface than said one recording layer is examined by using 15 recording layer management information and if data recorded and unrecorded parts are mixed together in an area whose recording state is examined, data is reproduced from said one recording layer after dummy data is recorded in the data unrecorded part.

20 9. An optical information recording method for recording data on an optical information recording and reproducing medium having a plurality of recording layers which allow recording and reproducing by irradiation with a laser beam,

25 characterized in that when data recording is performed on one recording layer, a recording state of the other recording layer nearer a laser beam incident surface

than said one recording layer is examined by using recording layer management information and if data recorded and unrecorded parts are mixed together in an area whose recording state is examined, data is recorded on the one 5 recording layer after dummy data is recorded in said data unrecorded part.

10. An optical information recording device for recording data on an optical information recording and reproducing medium having a plurality of recording layers 10 which allow recording and reproducing by irradiation with a laser beam,

characterized by comprising at least reproducing means for reproducing recording layer management information containing at least information indicating recording states of the recording layers, condensing means 15 for condensing a laser beam on a recording layer on or from which data is recorded or reproduced, and laser beam power switching means for examining, when data recording is performed on one recording layer by said condensing means, 20 a recording state of the other recording layer nearer a laser beam incident surface than said one recording layer by using the recording layer management information reproduced by said reproducing means, and changing setting of a laser beam output for the recording based on a 25 recording state of an area of said other recording layer stacked on an upper part of an area in which the recording is performed.

11. The optical information recording device according to claim 10, wherein said laser beam power switching means increases the laser beam output for the recording if data has been recorded in the area of said other recording layer  
5 stacked on the upper part of the area in which the recording is performed.

12. The optical information recording device according to claim 10, wherein said laser beam power switching means reduces the laser beam output for the recording if data has  
10 been recorded in the area of said other recording layer stacked on the upper part of the area in which the recording is performed.

13. An optical information reproducing device for reproducing data from an optical information recording and  
15 reproducing medium having a plurality of recording layers which allow recording and reproducing by irradiation with a laser beam,

characterized by comprising at least reproducing means for reproducing recording layer management information containing at least information indicating recording states of the recording layers, condensing means for condensing a laser beam on a recording layer from which data is reproduced, and laser beam power switching means for examining, when data reproducing is performed on one recording layer by said condensing means, a recording state of the other recording layer nearer a laser beam incident surface than said one recording layer by using the  
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recording layer management information reproduced by said  
reproducing means, and changing setting of a laser beam  
output for the reproducing based on a recording state of an  
area of said other recording layer stacked on an upper part  
5 of an area in which the reproducing is performed.

14. The optical information reproducing device  
according to claim 13, wherein said laser beam power  
switching means increases the laser beam output for the  
reproducing if data has been recorded in the area of said  
10 other recording layer stacked on the upper part of the area  
in which the reproducing is performed.

15. The optical information reproducing device  
according to claim 13, wherein said laser beam power  
switching means reduces the laser beam output for the  
reproducing if data has been recorded in the area of said  
15 other recording layer stacked on the upper part of the area  
in which the reproducing is performed.

16. An optical information recording device for  
recording data on an optical information recording and  
20 reproducing medium having a plurality of recording layers  
which allow recording and reproducing by irradiation with a  
laser beam,

characterized by comprising at least reproducing  
means for reproducing recording layer management  
25 information containing at least information indicating  
recording states of the recording layers, condensing means  
for condensing a laser beam on a recording layer on which

data is recorded, and laser beam power switching means for examining, when data recording is performed on one recording layer by said condensing means, a recording state of the other recording layer nearer a laser beam incident 5 surface than said one recording layer by using the recording layer management information reproduced by said reproducing circuit, and changing setting of a laser beam output for the recording based on a recording state of an area of said other recording layer stacked on an upper part 10 of an area in which the recording is performed,

and in that if data recorded and unrecorded parts are mixed together in the area of the other recording layer stacked on the upper part of the area in which the recording is performed, the area in which the recording is 15 performed by the condensing means is moved to another area.

17. An optical information recording and reproducing device for recording or reproducing data on or from an optical information recording and reproducing medium having a plurality of recording layers which allow recording and 20 reproducing by irradiation with a laser beam,

characterized by comprising at least reproducing means for reproducing recording layer management information containing at least information indicating recording states of the recording layers, condensing means 25 for condensing a laser beam on a recording layer on/from which data is recorded or reproduced, and laser beam power switching means for examining, when data is reproduced from

one recording layer by said condensing means, a recording state of the other recording layer nearer a laser beam incident surface than said one recording layer by using the recording layer management information reproduced by said 5 reproducing circuit, and changing setting of a laser beam output for the recording or reproducing based on a recording state of an area of said other recording layer stacked on an upper part of an area in which the recording or reproducing is performed,

10 and in that if data recorded and unrecorded parts are mixed together in the area of said other recording layer stacked on the upper part of the area in which the recording or reproducing is performed, said condensing means reproduces data from said one recording layer after 15 dummy data is recorded in the data unrecorded part.

18. An optical information recording device for recording data on an optical information recording and reproducing medium having a plurality of recording layers which allow recording and reproducing by irradiation with a 20 laser beam,

characterized by comprising at least reproducing means for reproducing recording layer management information containing at least information indicating recording states of the recording layers, condensing means 25 for condensing a laser beam on a recording layer on which data is recorded, and laser beam power switching means for examining, when data is recorded on one recording layer by

said condensing means, a recording state of the other recording layer nearer a laser beam incident surface than said one recording layer by using the recording layer management information reproduced by said reproducing means,  
5 and changing setting of a laser beam output for the recording based on a recording state of an area of said other recording layer stacked on an upper part of an area in which the recording is performed,

10 and in that if data recorded and unrecorded parts are mixed together in the area of said other recording layer stacked on the upper part of the area in which the recording is performed, said condensing means records data on said one recording layer after dummy data is recorded in the data unrecorded part.

15 19. An optical information recording and reproducing medium having a plurality of recording layers which allow recording and reproducing by irradiation with a laser beam, characterized in that each recording layer comprises a recording area in which user data is recorded, and a recording management area in which recording layer management information containing at least information indicating recording states of a plurality of areas into which the inside of said recording area is divided is recorded,

20 25 and recording layer management information of one recording layer is recorded in each of the recording management areas of said one recording layer and one or

more recording layers farther from a laser beam incident surface than said one recording layer.

20. The optical information recording and reproducing medium according to claim 19, wherein defect management 5 information indicating a defect position of said recording layer is further recorded in the recording management area of each recording layer.

21. The optical information recording and reproducing medium according to claim 20, wherein the defect management 10 information of said one recording layer is recorded in a recording management area of the other recording layer.

22. The optical information recording and reproducing medium according to claim 19, wherein a guide groove of a wobbling shape is formed in at least one track of said 15 recording layer, and the guide groove of the wobbling shape is subjected to track modulation for indicating a track address.